

EXPRESS MAIL NO. EV 36777662045

EV 032 107 578 US

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449B/PTO

**SUPPLEMENTAL  
INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet 1 of 1**Complete if Known**

Application Number	09/638,485
Filing Date	August 14, 2000
First Named Inventor	JACOBUS, Charles J.
Art Unit	2837
Examiner Name	SMITH, Tyrone W.
Attorney Docket Number	IMM069D

**U.S. PATENT DOCUMENTS**

Examiner	Cite No. <sup>1</sup>	Document Number Number Kind Code <sup>2</sup> (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
MS	1	6,219,034	4/17/01	Elbing, et al.	

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)			
MS	2	JP	01-003664		7/19/1990	Taito Corporation	✓
↓	3	JP	02-109714		1/13/1992	Epoch Co. and Key- Planning Co.	✓
	4	JP	05-193862		1/27/1995	Sega Corporation	✓
MS	5	JP	04-007371		8/3/1993	Taito Corporation	✓

**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
	6	SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994.

Examiner  
Signature

/Mansour Said/

Date  
Considered

11/12/2006

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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**Notice of References Cited**

Application/Control No.

09/638,485

Applicant(s)/Patent Under  
Reexamination  
JACOBUS ET AL

Examiner

Tyrone W Smith

Art Unit

2837

Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-4278920	07-1981	Ruoff	318/2
	B	US-4621332	11-1986	Sugimoto et al	364/513
	C	US-4791588	12-1988	Onda et al	364/513
	D	US-5155423	10-1992	Karlen et al	318/568.11
	E	US-5266875	11-1993	Slotine et al	318/568.11
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
 Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet 1 of 5

**Complete If Known**

Application Number	09/638,485
Filing Date	August 14, 2000
First Named Inventor	Charles J. JACOBUS
Group Art Unit	2837
Examiner Name	Tyrone W. Smith
Attorney Docket Number	IMM069D

**U.S. PATENT DOCUMENTS**

Examiner	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number Kind Code <sup>2</sup> (if known)			
MS	AA	3,220,121	11/30/1986	Cutler	
	AB	3,517,448	8/30/1970	Corlyon et al.	
	AC	3,903,814	9/9/1975	Diamond et al.	
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	AS	4,160,508	7/10/1978	Salsbury	
	AT	4,581,491	4/8/1988	Boothroyd	
	AU	4,930,770	8/5/1990	Baker	
	AV	4,934,894	8/19/1990	McIntosh	
	AW	5,035,242	7/30/1991	Franklin	
	AX	5,038,089	8/8/1991	Szakaly	
	AY	5,078,152	1/7/1992	Bond	
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	BE	5,488,213	11/14/1995	Hogan	
	BF	5,786,018	8/18/1998	Sinclair	
	BG	5,186,885	2/18/1993	Mangseth et al.	
	BH	6,422,941	7/23/2002	Thomer et al.	
MS		6,111,577	8/29/2000	Zilles et al.	

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Date  
Considered

11/12/2006

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<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Kinds of U.S. Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 801.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

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Sheet 2

of

5

**Complete if Known**

Application Number	09/638,485
Filing Date	August 14, 2000
First Named Inventor	Charles J. JACOBUS
Group Art Unit	2837
Examiner Name	Tyrone W. Smith
Attorney Docket Number	IMM069D

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		Country Code <sup>2</sup>	Number <sup>3</sup>	Kind Code <sup>4</sup> (if known)			
MS	BI	EP	EP0349086		1/31/1990	Visser	

Examiner Signature	/Mansour Said/	Date Considered	11/12/2006
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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

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Sheet 3

of

5

**Complete if Known**

Application Number	09/638,485
Filing Date	August 14, 2000
First Named Inventor	Charles J. JACOBUS
Group Art Unit	2837
Examiner Name	Tyrone W. Smith
Attorney Docket Number	IMM069D

**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
MS	BJ	BAIGRIE, "Electric Control Loading - A Low Cost, High Performance Alternative," Proceedings, pp. 247-254, November 8-8, 1990.
	BK	IWATA, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp 287-292, 1993.
	BL	RUSSO, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," MIT Libraries Archives 08/14/1990, pp. 1-131, May 1990.
	BM	BROOKS et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11; NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985.
	BN	JONES et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, Vol. 79, No. 1, pp. 150-156, 1990.
	BO	BURDEA et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 IEEE International Conference on Robotics and Automation, pp. 25-44, 05/02/1993.
	BP	SNOW et al., "Model-X Force-Reflecting-Hand-Controller," NT Control no. MPO-17851; JPL Case No. 5348, pp. 1-4, 06/15/1989.
	BQ	OUH-YOUNG, "Force Display in Molecular Docking," Order No. 9034744, p. 1-369, 1990.
	BR	TADROS, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators, MIT Archive@ Massachusetts Institute of Technology, pp. 1-88, February 1990.
	BS	CALDWELL et al., "Enhanced Tactile Feedback (Tele-Traction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993.
	BT	ADELSTEIN, "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," DSC-Vol. 42, Advances in Robotics, Edited by H. Kazerooni, pp. 1-12, 1992.
	BU	GOTOW et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11-11:00, pp. 332-337
✓	BV	STANLEY et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSV-Vol. 42, Advances in Robotics, pp. 55-61, ASME 1992.
MS	BW	RUSSO, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, Advances in Robotics, pp. 63-70, ASME 1992.

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Signature

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Substitute for form 1440A/PTO		<b>Complete If Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (use as many sheets as necessary)		Application Number	09/638,485
		Filing Date	August 14, 2000
		First Named Inventor	Charles J. JACOBUS
		Group Art Unit	2837
		Examiner Name	Tyrone W. Smith
Sheet 4 of 5	Attorney Docket Number	IMM069D	

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
MS	BX	KONTARINIS et al., "Display of High-Frequency Tactile Information to Teleoperators," Telemanipulator Technology and Space Telerobotics, Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993.	
	BY	PATRICK et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics In Space, Rui J. deFigueiredo et al., Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990.	
	BZ	ADELSTEIN, "A Virtual Environment System For The Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989.	
	CA	BEJCZY, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980.	
	CB	BEJCZY, "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings Of Fourth CISM-IFTOMM, Sep. 8-12, 1981.	
	CC	MCAFFEE, "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," JPL D-5172, pp. 1-50, A1-A38, B1-B5, C1-C36, January 1988.	
	CD	MINSKY, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT, June 1995.	
	CE	JACOBSEN et al., "High Performance, Dexterous Telerobotic Manipulator With Force Reflection," Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991.	
	CF	SHIMOGA, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30 - Oct. 1, 1992.	
	CG	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990.	
	CH	TERRY et al., "Tactile Feedback In A Computer Mouse," Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988.	
	CI	HOWE, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992.	
✓	CJ	EBERHARDT et al., "OMAR – A Haptic display for speech perception by deaf and def-blind individuals," IEEE Virtual Reality Annual International Symposium, Seattle, WA, Sep. 18-22, 1993.	
MS	CK	RABINOWITZ et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987.	

Examiner Signature	/Mansour Said/	Date Considered	11/12/2006
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Sheet 5

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**Complete If Known**

Application Number	09/638,485
Filing Date	August 14, 2000
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Group Art Unit	2837
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Attorney Docket Number	IMM069D

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MS	CL	BEJCZY et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980.	
	CM	BEJCZY et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989.	
	CN	OUH-YOUNG, "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," IEEE Transactions on Consumer Electronics, Vol. 41, No. 3, August 1995.	
	CO	MARCUS, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994.	
	CP	BEJCZY, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987.	
	CQ	AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180, 1992.	
	CR	EBERHARDT et al., "Including Dynamic Haptic Perception by The Hand: System Description and Some Results," DSC-Vol. 55-1, Dynamic Systems and Control: Volume 1, ASME 1994.	
	CS	GOBEL et al., "Tactile Feedback Applied to Computer Mice," International Journal of Human-Computer Interaction, Vol. 7, No. 1, pp. 1-24, 1995.	
	CT	PIMENTEL et al., "Virtual Reality: through the new looking glass," 2 <sup>nd</sup> Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.	
	CU	"Cyberman Technical Specification," Logitech Cyberman SWIFT Supplement, 4/5/1994.	
✓	CV	OUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95, Seoul, Korea, 21-24 August 1995.	
MS	CW	KACZMAREK et al., "Tactile Displays," Virtual Environment Technologies.	

Examiner  
Signature

/Mansour Said/

Date  
Considered

11/12/2006

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<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	Atty Docket No.:	Application No.:
	MM1P069D	09/638,485
	Applicant:	
	Schuler et al.	
	Filing Date:	Group:
	8/14/00	2837

## U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub- class	Filing Date
MS	A	4,937,685	6/26/90	Barker et al.	360	14.1	12/2/83
	B	4,964,004	10/16/90	Barker	360	14.1	6/16/89
	C	4,983,901	1/8/91	Lehmer	318	685	4/21/89
	D	5,076,517	12/31/91	Ferranti et al.	244	228	8/14/89
	E	5,184,319	2/2/93	Kramer	364	806	2/2/90
	F	5,286,203	2/15/94	Fuller et al.	434	45	10/7/92
	G	5,354,162	10/11/94	Burdea et al.	414	5	8/31/92
	H	5,428,748	6/27/95	Davidson et al.	395	275	9/24/92
	I	5,634,794	6/3/97	Hildreth et al.	434	37	3/23/95
MS	J	5,742,278	4/21/98	Chen et al.	345	156	11/1/95
	K	5,781,172	7/14/98	Engel et al.	345	164	6/16/97

## Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub- class	Translation	
							Yes	No
MS	L	0085518	10.08.83	EPO	—	—	X	
	M	0111992	27.06.84	EPO	—	—	X	
	N	0349086	03.01.90	EPO	—	—	X	
	O	2235310	27.02.91	GB	—	—	X	
MS	P	0326439	2.8.89	EPO	—	—		

## Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Flight Simulation, Rolfe, J.M. and Staples, K. J., eds., 1986.
MS	S	
MS	T	
Examiner /Mansour Said/		Date Considered 11/12/2006

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	Atty Docket No.:	Application No.:
	IMM1P069D	09/638,485
	Applicant:	
	Schuler et al.	
	Filing Date:	Group:
	8/14/00	2837

**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	5,999,168	12/7/99	Rosenberg et al.	345	161	2/21/97
MS	B	6,088,017	7/11/00	Tremblay et al.	345	156	4/24/98
	C						
	D						
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**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
MS	L	95/20788	3.8.95	PCT	/	/	X	
	M	0626634	30.11.94	EPO	/	/	X	
	N	H6-210065	2.8.94	Japan	/	/	X	
	O	H4-92691	25.3.92	Japan	/	/	X	
MS	P	H5-86387	22.11.93	Japan	/	/	X	

**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
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Examiner /Mansour Said/		Date Considered 11/12/2006

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EXPRESS MAIL NO. EV36777662005

<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	Atty Docket No.:	Application No.:
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## U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A						
	B						
	C						
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## Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
MS	L	S62-194389	10.12.87	Japan			X	
↓	M	0607580	27.7.94	EPO			X	
↓	N	92/00559	9.1.92	PCT			X	
↓	O	JP4092691	25.3.92	Japan			X	
MS	P	JP7024147	27.1.95	Japan			X	

## Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
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Examiner /Mansour Said/		Date Considered. 11/12/2006

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**U.S. Patent Documents**

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	A						
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**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub- class	Translation	
							Yes	No
MS	L	JP4008381	13.1.92	Japan	<del>          </del>	<del>          </del>	X	
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	N							
	O							
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**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
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Examiner /Mansour Said/		Date Considered 11/12/2006

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<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	Atty Docket No.:	Application No.:
	IMM-00607/03	09/638,485
	Applicant:	
	Jacobus et al.	
Filing Date:	Group:	
8/14/00	2837	

**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	3,919,691	11/11/75	Noll	340	172.5	5/26/71
	B	4,436,188	03/13/84	Jones	188	378	11/18/81
	C	4,603,284	7/29/86	Perzley	318	568	6/5/84
	D	4,604,016	8/5/86	Joyce	414	7	8/3/83
	E	4,775,289	10/4/88	Kazerooni	414	735	9/25/87
	F	4,795,296	1/3/89	Jau	414	5	11/17/86
	G	4,800,721	01/31/89	Cemenska et al.	60	393	2/13/87
	H	4,861,269	8/29/89	Meenan, Jr.	434	45	03/30/88
	I	4,925,312	5/15/90	Onaga et al.	364	513	3/21/88
MS	J	4,949,119	8/14/90	Moncrief et al.	364	578	1/12/89
	K	5,007,300	4/16/91	Siva	74	471 XY	1/22/90

**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
	L	WO9532459	30 Nov 95	PCT			X	
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	N							
	O							
	P							

**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Ellis, et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface", DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces ASME 1993.
MS	S	Schmult, "Application Areas for a Force-Feedback Joystick", Department of Machine Perception Research AT&T Bell Laboratories, Holmdel, New Jersey, DSC-Vol 49, Interfaces ASME 1993.
MS	T	Adelstein, et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control Research", Steling Software Aerospace Human Factors Research Division, NASA-Ames, Moffett Field, CA, 1992.
Examiner /Mansour Said/		Date Considered 11/12/2006

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	<b>Atty Docket No.:</b>	<b>Application No.:</b>
	IMM-00607/03	09/638,485
	<b>Applicant:</b>	
	Jacobus et al.	
	<b>Filing Date:</b>	<b>Group:</b>
	8/14/00	2837

**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	5,044,956	09/03/91	Behensky et al.	434	45	1/12/89
	B	5,065,145	11/12/91	Purcell	340	706	10/6/89
	C	5,103,404	4/7/92	McIntosh	318	568.22	12/20/89
	D	5,107,080	4/21/92	Rosen	200	6A	12/1/89
	E	5,116,180	5/26/92	Fung et al.	414	5	5/3/90
	F	5,146,566	9/8/92	Hollis, Jr.	395	275	05/29/91
	G	5,156,363	10/20/92	Cizewski et al.	244	223	2/28/91
	H	5,185,561	2/9/93	Good et al.	318	432	7/23/91
	I	5,193,963	3/16/93	McAfee et al.	414	5	10/31/90
MS	J	5,197,003	3/23/93	Moncrief et al.	364	410	4/7/92
MS	K	5,203,563	4/20/93	Loper, III	273	148	3/21/91

**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
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**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Hiroo Iwata, "Pen-based Haptic Virtual Environment", Institute of Engineering Mechanics, University of Tsukuba, Tsukuba, 305 JAPAN
MS	S	Batter, et al., "Grove-1: A Computer Display to the Sense of Feel", University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA
MS	T	Minsky, et al., "Feeling and Seeing: Issues in Force Display", Department of Computer Science, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, 1990 ACM.
Examiner: /Mansour Said/		Date Considered 11/12/2006

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	IMM-00607/03	09/638,485
	Applicant:	
	Jacobus et al.	
	Filing Date:	Group:
	8/14/00	2837

**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	5,223,776	6/29/93	Radke et al.	318	568.1	12/31/90
	B	5,228,356	7/20/93	Chuang	74	471	11/25/91
	C	5,264,768	11/23/93	Gregory et al.	318	561	10/6/92
	D	5,275,565	2/23/93	Moncrief	434	29	2/23/93
	E	5,381,080	1/10/95	Schnell et al.	318	566	2/18/93
	F	5,414,337	5/9/95	Schuler	318	561	6/11/93
	G	5,459,382	10/17/95	Jacobus et al.	318	568.11	6/9/94
	H	5,513,100	4/30/96	Parker et al.	364	167.01	6/10/93
	I	5,576,727	11/19/96	Rosenberg et al.	345	179	6/5/95
	J	5,577,981	11/26/96	Jarvik	482	4	8/4/95
MS	K	5,587,937	12/24/96	Massie et al.	364	578	4/25/95

**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
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	O							
	P							

**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Russo, "The Design and Implementation of a Three Degree-of-Freedom Force Output Joystick", Submitted to the Department of Mechanical Engineering on May 11, 1990.
MS	S	Rosenberg, Louis B., "Perceptual Design of a Virtual Rigid Surface Contact," Center for Design Research Stanford University, Air Force Material Command, April 1993, pp. 1-41.
MS	T	Atkinson, William D. et al, "Computing with Feeling," Comput. & Graphics, Vol. 2, No. 2-E, pp. 97-103.
Examiner /Mansour Said/		Date Considered 11/12/2006

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	IMM-00607/03	09/638,485
	Applicant:	
	Jacobus et al.	
	Filing Date:	Group:
	8/14/00	2837

**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	5,589,828	12/31/96	Armstrong	341	20	3/5/92
	B	5,589,854	12/31/96	Tsai	345	161	6/22/95
	C	5,625,576	4/29/97	Massie et al.	364	578	10/1/93
	D	5,642,469	6/24/97	Hannaford	395	99	11/3/94
	E	5,643,087	7/1/97	Marcus et al.	463	38	7/29/94
	F	5,709,219	01/20/98	Chen et al.	128	782	08/01/96
	G	5,721,566	2/24/98	Rosenberg et al.	345	161	6/9/95
	H	5,731,804	3/24/98	Rosenberg	345	156	1/18/95
	I	5,734,373	3/31/98	Rosenberg et al.	345	161	12/1/95
MS	J	5,767,839	6/16/98	Rosenberg	345	161	3/3/95
	K	5,769,640	7/23/98	Jacobus et al.	434	262	8/10/95

**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
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	M							
	N							
	O							
	P							

**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Adelstein Bernard D. et al., "A High Performance Two Degree-of-Freedom Kinesthetic Interface," Massachusetts Institute of Technology 1992, pp. 108-112.
MS	S	Hannaford, B. et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Transactions on Systems, Man, and Cybernetics, 1991.
MS	T	Howe, R. et al., "Task Performance with a Dextrous Teleoperated Hand System," Proceedings of SPIE, Vol. 1833, Nov. 1992.
Examiner /Mansour Said/		Date Considered 11/12/2006

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	IMM-00607/03	09/638,485
	Applicant:	
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	Filing Date:	Group:
	8/14/00	2837

**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	5,790,108	8/4/98	Salcudean et al.	345	184	10/23/92
MS	B	5,889,670	3/30/99	Schuler et al.	364	186	6/11/96
MS	C	5,889,672	3/30/99	Schuler et al.	364	188	6/3/98
	D						
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**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
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	N							
	O							
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**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Kelley, A.J. et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Engineering, Univ. of British Columbia, 1993, pp. 1-27.
MS	S	Iwata, H., "Artificial Reality with Force-feedback: Development of Desktop Virtual Space with Compact Master Manipulator," Computer Graphics, Vol. 24, No. 4, 1990, pp. 165-170.
MS	T	Hayward, Vincent et al. "Design and Multi-Objective Optimization of a Linkage for a Haptic Interface," Advances in Robot Kinematics and Computationed Geometry, Kluwer Academic Publishers, 1994, pp. 359-368.
Examiner: /Mansour Said/		Date Considered 11/12/2006

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	Att'y Docket No.:	Application No.:
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## U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A						
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## Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
	L							
	M							
	N							
	O							
	P							

## Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Bostrom, M. et al., "Design of An Interactive Lumbar Puncture Simulator With Tactile Feedback," IEEE 0-7803-1363, 1993, pp. 280-286.
MS	S	Ramstein, Christophe, "The Pantograph: A Large Workspace Haptic Device for a Multimodal Human-Computer Interaction", Computer-Human Interaction, CHI 1994.
MS	T	Hirota, Koichi, "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262.
Examiner /Mansour Said/		Date Considered 11/12/2006

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	Applicant:	
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**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A						
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**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
	L							
	M							
	N							
	O							
	P							

**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Millman, P. et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum with a Specified Force/Torque Workspace," IEEE Int'l Conf. on Robotics and Automation, IEEE CH2969-4, 1991, pp. 1488-1493.
MS	S	Jones, L.A. et al., "A Perceptual Analysis of Stiffness," Experimental Brain Research 1990, pp. 151-156.
MS	T	Kotoku, Tetsuo, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," IEEE 1992, July 7-10, 1992, pp. 239-246.
Examiner /Mansour Said/		Date Considered 11/12/2006

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	Jacobus et al.	
Filing Date:	Group:	
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## U.S. Patent Documents

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	A						
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## Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub- class	Translation	
							Yes	No
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	O							
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## Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Salcudean, S.E. et al., "A Six Degree-of-Freedom, Hydraulic, One Person Motion Simulator," Dept. of Elec. Engineering, Univ. of British Columbia, 1992, pp. 1-7.
	S	
	T	
Examiner /Mansour Said/		Date Considered 11/12/2006

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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**U.S. Patent Documents**

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	4,538,035	8/27/95	Pool	200	6A	10/13/83
	B	5,113,179	5/12/92	Scott-Jackson	340	709	3/16/90
	C	5,209,661	5/93	Hildreth et al.	434	45	10/29/90
	D	5,220,260	6/15/93	Schuler	318	561	10/24/91
	E	5,366,376	11/22/94	Copperman et al.	434	69	5/22/92
	F	5,368,484	11/29/84	Copperman et al.	434	69	2/17/93
	G	5,435,729	7/95	Hildreth et al.	434	365	3/19/93
	H	5,559,432	9/24/96	Logue	324	207.17	6/29/94
↓	I	5,701,140	12/23/97	Rosenberg et al.	345	156	7/12/94
	J	5,739,811	4/14/98	Rosenberg et al.	345	161	9/27/95
MS	K	5,880,714	3/9/99	Rosenberg et al.	345	156	1/15/97

**Foreign Patent or Published Foreign Patent Application**

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
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**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Rutherford, M. "Third Generation Digital Flight Controls," CAE Electronics, Ltd., The Royal Aeronautical Society, 1984 Spring Convention Future Applications and Prospects for Flight Simulation, May 9-10, 1984, paper number 15.
MS	S	De Vries, L. and Wierda, G. J., "Performance Considerations, Design Criteria and Realization of a Digital Control Loading System," International Air Transport Association, Seventh Flight Simulator Technical Sub-Committee Meeting, Agenda Item 10, Montreal, Sept. 17-20, 1984.
MS	T	Baradat, Jean and Lacroix, Michel, "Advanced Features in Control Loading and Motion Systems for Simulators," National Security Industrial Association 1 <sup>st</sup> Interservice/Industry Training Equipment Conference Proceedings, Nov. 27-29, 1981.
Examiner /Mansour Said/		Date Considered 11/12/2006

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	Applicant:	
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8/14/00	2837	

## U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
MS	A	6,057,828	5/2/00	Rosenberg et al.	345	156	1/16/97
	B						
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## Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
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## Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Norlin, Ken A., "Flight Simulation Software at NASA Dryden Flight Research Center," American Institute of Aeronautics and Astronautic's Flight Simulation Technologies Conference, Baltimore, MD, August 7-10, 1995.
MS	S	Corrao, Joseph M., "Control Loading," American Institute of Aeronautics and Astronautic's Flight Simulation Update 1987, Jan. 12-16, 1987
MS	T	Corrao, J.M., "Control Loading," American Institute of Aeronautics and Astronautic's Flight Simulation Update 1988, Jan. 11-15, 1988.
Examiner /Mansour Said/		Date Considered 11/12/2006

Examiner: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<b>Form 1449 (Modified)</b>  <b>Information Disclosure Statement By Applicant</b>  (Use Several Sheets if Necessary)	Atty Docket No.:	Application No.:
	IMM-00607/03	09/638,485
	Applicant:	
	Schuler et al.	
	Filing Date:	Group:
	8/14/00	2837

## U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-class	Filing Date
	A						
	B						
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## Foreign Patent or Published Foreign Patent Application

Examiner Initial	No.	Document No.	Publication Date	Country or Patent Office	Class	Sub-class	Translation	
							Yes	No
	L							
	M							
	N							
	O							
	P							

## Other Documents

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Rinaldi, P., "Digital Control Loading - A Modular Approach," International Air Transport Association 6 <sup>th</sup> Meeting of the Flight Simulator Technical Sub-Committee, Montreal, June 1-4, 1982.
MS	S	Hildreth, Bruce L., Eyermann, Roger E. and Trankle, Thomas Dr., "DC Servo-Motors for High Performance High Reliability Control Loading in Flight Simulators," American Defense Preparedness Association 12 <sup>th</sup> Interservice/Industry Training System Conference, Nov. 6-8, 1990.
MS	T	Baigrie, Stephen A., Reflectone Inc., "Electric Control Loading - A Low Cost, High Performance Alternative," American Defense Preparedness Association 12 <sup>th</sup> Interservice/Industry Training System Conference, Nov. 6-8, 1990.
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Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	"Digital Control Loading", Giel et al., Summary, Paper 2, Paper 3, International Air Transport Association, Seventh Flight Simulator Technical Sub-Committee Meeting, Item number 10, Montreal, Sept. 17-20, 1984.
MS	S	Seidensticker, Steve, "Application of Microcomputers to the Simulator 'Linkage' Problem," National Security Industrial Association 4 <sup>th</sup> Interservice/Industry Training Equipment Conference Proceedings, Nov. 16-18, 1982.
MS	T	Flight Simulation, Rolfe, J.M. and Staples, K. J., eds., 1986.
Examiner /Mansour Said/		Date Considered 11/12/2006

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	M							
	N							
	O							
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**Other Documents**

Examiner Initial	No.	Author, Title, Date, Place (e.g. Journal) of Publication
MS	R	Albers, F. Gerry, "Microcomputer Base for Control Loading," Naval Training Equipment Center 11 <sup>th</sup> NTEC-Industry Conference Proceedings, NAVTRAEQUIPCEN IH-306, Nov. 14-16, 1978.
	S	
	T	
Examiner		Date Considered
/Mansour Said/		11/12/2006

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